

changing said time interval for measurement in accordance with an exposure condition for transferring said pattern of said mask onto said substrate;

measuring a transmittance of said optical system at said changed time interval for measurement;

setting an exposure amount control target value in accordance with said measured transmittance of said optical system; and

transferring said pattern onto said substrate through said optical system, while an exposure amount is controlled based on a photodetection result of a part of said exposure light photodetected between said light source and said mask and said set exposure amount control target value.

4. (Twice Amended) An exposure method according to Claim 1, wherein said exposure condition includes a transmittance of said mask.

5. (Twice Amended) An exposure method according to Claim 1, wherein said exposure condition includes one of a minimum line width of said pattern and a permissible exposure amount error.

6. (Thrice Amended) An exposure method to transfer a pattern of a mask illuminated with exposure light from a light source onto a substrate through an optical system, said method comprising:

setting a time interval for measurement of a transmittance of said optical system;

changing said time interval for measurement in accordance with a variation amount of a transmittance of said optical system;

measuring a transmittance of said optical system at said changed time interval for measurement;

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setting one exposure condition of said at least two exposure conditions; and

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measuring a variation in the amount of said exposure light passing through said optical system at a predetermined time interval for measurement; and

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23. (Amended) An exposure method according to Claim 14, further comprising:

obtaining a transmittance of said optical system in accordance with an amount of said exposure light which is measured before passing through said optical system, and said measurement result of said exposure light passing through said optical system.

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24. (Thrice Amended) An exposure apparatus to transfer a pattern illuminated with exposure light from a light source onto a substrate, said exposure apparatus comprising:

a branch optical system arranged in an optical path of said exposure light to branch a part of said exposure light;

an optical system arranged between said branch optical system and said substrate;

a transmittance measurement unit to measure a transmittance of said optical system at a predetermined time interval;

a control unit connected with said transmittance measurement unit to change said time interval in accordance with an exposure condition for transferring said pattern onto said substrate;

an exposure amount setting unit connected with said transmittance measurement unit to set an exposure amount control target value in accordance with a transmittance of said optical system that is measured by said transmittance measurement unit at said changed time interval; and

an exposure amount control system connected with said exposure amount setting unit to control an exposure amount based on said set exposure amount control target value.

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42. (Thrice Amended) An exposure apparatus to transfer a pattern illuminated with exposure light from a light source onto a substrate, said exposure apparatus comprising:

a branch optical system arranged in an optical path of said exposure light to branch a part of said exposure light;

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an optical system arranged between said branch optical system and said substrate;  
a first sensor arranged in the optical path of a part of said branched exposure light to photodetect a part of said exposure light;  
a second sensor arranged substantially flush with said substrate to photodetect said exposure light passing through said optical system;  
a measurement unit connected with said first sensor and said second sensor to measure a variation in an amount of exposure light passing through said optical system at a predetermined time interval, based on an output signal from said first sensor and an output signal from said second sensor; and  
a control unit connected with said measurement unit to change said time interval in accordance with an exposure condition for transferring said pattern onto said substrate.

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46. (Thrice Amended) An exposure apparatus to transfer a pattern illuminated with exposure light from a light source onto a substrate through an optical system, said exposure apparatus comprising:

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a measurement unit to measure an amount of exposure light passing through said optical system and reaching onto said substrate at a predetermined time interval;  
a selection unit to select any exposure condition among a plurality of exposure conditions for transferring said pattern onto said substrate; and  
a control unit to change said time interval of said measurement unit in accordance with said any exposure condition selected by said selection unit.

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Please add new Claims 69-85 as follows:

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69. (New) An exposure method according to Claim 59, wherein said optical system includes a part of an illumination optical system to illuminate said mask and a projection optical system to transfer said pattern onto said substrate.

70. (New) An exposure method according to Claim 69, wherein a transmittance of said optical system is a ratio between a photodetection result of a part of said exposure light photodetected between said light source and said mask, and a photodetection result of said exposure light passing through said optical system.

71. (New) An exposure method according to Claim 70, wherein said time interval for measurement is determined by the number of said substrates onto which said pattern can be transferred.

72. (New) An exposure method according to Claim 60, wherein a transmittance of said optical system is a ratio between a photodetection result of a part of said exposure light photodetected between said light source and said mask, and a photodetection result of said exposure light passing through said optical system.

73. (New) An exposure method according to Claim 14, wherein said optical system includes a part of an illumination optical system to illuminate said mask and a projection optical system to transfer said pattern onto said substrate.

74. (New) An exposure method according to Claim 14, wherein a transmittance of said optical system is a ratio between a photodetection result of a part of said exposure light photodetected between said light source and said mask, and a photodetection result of said exposure light passing through said optical system.

75. (New) An exposure method according to Claim 14, wherein said time intervals that are different from one another are determined by the number of said substrates onto which said pattern can be transferred.

76. (New) An exposure method according to Claim 16, wherein said time interval for measurement is determined by the number of said substrates onto which said pattern can be transferred.

77. (New) An exposure method according to Claim 16, wherein said optical system includes a part of an illumination optical system to illuminate said mask and a projection optical system to transfer said pattern onto said substrate.

78. (New) An exposure method according to Claim 77, wherein a variation of said light amount is calculated based on a photodetection result of a part of said exposure light photodetected between said light source and said mask and a photodetection result of said exposure light passing through said optical system.

79. (New) An exposure apparatus according to Claim 61, wherein a transmittance of said optical system is a ratio between an output signal of said first sensor and an output signal of said second sensor.

80. (New) An exposure apparatus according to Claim 24, wherein said exposure condition includes an illumination condition to illuminate said mask, and the illumination condition includes one of a ring-shaped illumination and a modified illumination.

81. (New) An exposure apparatus according to Claim 42, wherein said measurement unit measures a variation in the amount of said exposure light based on a ratio between an output signal from said first sensor and an output signal from said second sensor.

82. (New) An exposure apparatus according to Claim 42, wherein said exposure condition includes at least one of an illumination condition to illuminate a mask on which said pattern is formed, a transmittance of the mask on which said pattern is formed, a minimum line width of said pattern, and a permissible exposure amount error.

83. (New) An exposure apparatus according to Claim 45, said time-varying prediction function has a period of time in which the operation of said apparatus is stopped as a parameter.